

c. Alignment of Proposed Facilities with Channel

5. Impacts on Environmentally Sensitive Areas

10.2 Drainage Policy

10.2.1 Introduction

This part contains procedures and criteria that are essential for roadway drainage design.

10.2.2 Stormwater Management and Non-Point Source Pollution Control

Stormwater is a component of the total water resources of an area and should not be casually discarded but rather, where feasible, should be used to replenish that resource. In many instances, stormwater problems signal either misuse of a resource or unwise land activity.

Poor management of stormwater increases total flow, flow rate, flow velocity and depth of water in downstream channels. In addition to stormwater peak discharge and volume impacts, roadway construction or modification usually increases non-point source pollution primarily due to the increased impervious area. Properly designed stormwater management facilities, particularly detention/recharge basins, can also be used to mitigate non-point source pollution impacts by providing extended containment duration, thereby allowing settlement of suspended solids. Subsections 10.2.6, 10.11 and 10.12 of this Manual and the Stormwater Best Management Practices Manual prepared by the New Jersey Department of Environmental Protection (NJDEP) provide the guidance in the planning and design of these facilities. Web links to this NJDEP manual and additional guidance regarding stormwater, including regulatory compliance and permitting, may be found at <http://www.njstormwater.org>.

An assessment of the impacts the project will have on existing peak flows and watercourses shall be made by the design engineer during the initial phase. The assessment shall identify the need for stormwater management and non-point source pollution control (SWM & NPSPC) facilities and potential locations for these facilities. Mitigating measures can include, but are not limited to, detention/recharge basins, grassed swales, channel stabilization measures, and easements.

Stormwater management, whether structural or non-structural, on or off site, must fit into the natural environment, and be functional, safe, and aesthetically acceptable. Several alternatives to manage stormwater and provide water quality may be possible for any location. Careful design and planning by the engineer, hydrologist, biologist, environmentalist, and landscape architect can produce optimum results.

Design of SWM & NPSPC measures must consider both the natural and man-made existing surroundings. The design engineer should be guided by this and include measures in design plans that are compatible with the site specific surroundings. Revegetation with native, non-invasive grasses, shrubs and possibly trees may be required to achieve compatibility with the surrounding environment. Design of major SWM & NPSPC facilities may require coordination with the NJDOT Bureau of Landscape Architecture and Environmental Solutions, and other state and various regulatory agencies.

SWM & NPSPC facilities shall be designed in accordance with Subsections 10.11 and 10.12 and the *Stormwater Best Management Practices Manual* prepared by the NJDEP or other criteria where applicable, as directed by the Department.

Disposal of roadway runoff to available waterways that either cross the roadway or

are adjacent to it spaced at large distances, requires installation of long conveyance systems. Vertical design constraints may make it impossible to drain a pipe or swale system to existing waterways. Discharging the runoff to the groundwater with a series of leaching or seepage basins (sometimes called a Dry Well) may be an appropriate alternative if groundwater levels and non-contaminated, permeable soil conditions allow a properly designed system to function as designed. The decision to select a seepage facility design must consider geotechnical, maintenance, and possibly right-of-way (ROW) impacts and will only be allowed if no alternative exists.

The seepage facilities must be designed to store the entire runoff volume for a design storm compatible with the storm frequency used for design of the roadway drainage facilities or as directed by the Department. As a minimum, the seepage facilities shall be designed to store the increase in runoff volume from new impervious surfaces as long as adequate overflow conveyance paths are available to safely carry the larger flows to a stable discharge point.

Installation of seepage facilities can also satisfy runoff volume control and water quality concerns which may be required by an environmental permit.

Additional design guidelines are included in the NJDEP *Stormwater Best Management Practices Manual*.

Hydrology and Hydraulics Checklist for Access or Operations Permits (Developers)

Developers/designers who are proposing the development of properties adjacent to State roads/ROW that requires connection of their drainage system or that may hydraulically impact NJDOT drainage systems or roadways must comply with the NJDOT drainage standards. The developer/designer must also submit and address all items in this Hydrology and Hydraulics Checklist in order to obtain approval from NJDOT Hydrology and Hydraulics Unit necessary for Access or Drainage Permits.

| | Hydrology and Hydraulics Checklist for Permits | YES | NO | N/A |
|---|---|------------|-----------|------------|
| 1 | <p>The following items are required with each submission:</p> <ul style="list-style-type: none"> Hydrology and Hydraulics Checklist and Supporting information Stormwater Management (SWM) Report including the following: <ul style="list-style-type: none"> Project description including total area of disturbance and net increase in impervious area Summary tables demonstrating compliance with quality, quantity and groundwater recharge criteria All supporting data and detailed calculations Soil profile pit testing results Pipe and inlet analysis Plan Sheets: <ul style="list-style-type: none"> Existing and Proposed Drainage, Grading and Utility Plans Existing and Proposed Grading Plan at the entrance of the access point to the State Highway including grades of the gutter line ± 100 feet from the center of the access point. Profile of the Driveway (Access Point) and ± 100 feet from the center of the access point. Construction Details Maintenance Plan and Schedule for all Best Management Practices (BMPs) | | | |
| 2 | For new drainage which ties into existing roadway systems, demonstrate that the existing drainage system has adequate capacity and is free of any siltation or blockages. Reconstructed inlets or manholes, along with all of their associated pipes, must be cleaned (to the outfall). Whenever possible, eliminate proposed manholes or inlets within the traveled way of the road. | | | |
| 3 | Water has not been trapped on or diverted to another private property or another watershed. | | | |

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| 4 | The project triggers NJDEP Stormwater Management (SWM) Regulations (Major Development: One acre or more of disturbance or ¼ acre or more of new impervious) | | | |
| 4A | Quantity (Major Development) in accordance with N.J.A.C. 7:8-5.4. | | | |
| 4B | Quality (only if net increase of impervious by 1/4 acre or more) in accordance with N.J.A.C. 7:8-5.5. | | | |
| 4C | Groundwater Recharge (Major Development) in accordance with N.J.A.C. 7:8-5.6. | | | |
| 4D | Discharges within a 300-foot riparian zone provide 95% TSS reduction in accordance with N.J.A.C. 7:8 and 7:13. | | | |
| 5 | Quantity: No increase in the peak flow rates in the post-developed conditions is permitted to the NJDOT Drainage System. Quantity impacts are addressed at each discharge to the NJDOT drainage system. Calculations are shown for the 2, 10, 25, and 100-year storms. Please refer to Table 10-2 of the <i>NJDOT Roadway Design Manual</i> to determine if additional storm events need to be analyzed. | | | |
| 6 | Quantity: No increase in flows to the NJDOT gutter or other portions of the drainage system are allowed for the 2, 10, 25, and 100-year storms including increases resulting from curbing areas of existing umbrella drainage. | | | |
| 7 | Quantity: No increase in flooding to the NJDOT drainage system or roadway is permitted from adjacent drainage or streams for the 2, 10, 25, and 100 year storms. Please refer to Table 10-2 of the <i>NJDOT Roadway Design Manual</i> to determine if additional storm events need to be analyzed. | | | |
| 8 | Quality: Even if there is no increase in impervious cover: <ul style="list-style-type: none"> - If a project proposes storage or transport of petroleum products on areas which drain to any NJDOT drainage system, water quality mitigation will be required. - If the applicant proposes to change existing drainage patterns which may increase pollutant loads to the NJDOT drainage system, water quality treatment must be implemented. | | | |
| 9 | The NRCS method is utilized for stormwater management calculations OR where the rational method is used, the modified rational method is utilized to establish runoff volume for the critical duration as described in Appendix A9 of the <i>Soil Erosion and Sediment Control Standards in New Jersey</i> . | | | |
| 10 | All proposed basins utilizing infiltration meet the criteria of the groundwater mounding analysis as required by N.J.A.C. 7:8-5.4(a)2.iv. Infiltration basin drain down times utilize the reduced infiltration rate due to mounding to demonstrate that infiltration BMPs drain within 72 hours. | | | |
| 11 | Even if the project is not a major development, all BMPs are designed in accordance with the <i>NJ Stormwater Best Management Practices (BMP) Manual</i> . | | | |
| 12 | Drainage area maps are provided: <ul style="list-style-type: none"> - Inlet Drainage Area Maps - Existing and proposed sub-drainage area maps with Tc flow paths. | | | |
| 13 | All soil evaluation for establishing permeability rates, Seasonal High Water Table (SHWT), and Hydrologic Soil Groups is done in accordance with Appendix E of the <i>NJ Stormwater BMP Manual</i> . Soil logs provide ground elevations and all relevant elevations. | | | |
| 14 | The SHWT elevations, locations for the soil borings and profile pits, as well as locations of all stormwater management BMPs are shown on the plan sheets. | | | |
| 15 | The SHWT is at least 1 foot below any proposed detention basin and 2 feet below the bottom of any proposed infiltration BMP (infiltration | | | |

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| | basin, bio-retention with infiltration, underground infiltration structures, etc.) | | | |
| 16 | Outfall protection has been specified and shown on the construction plans where needed (length, width, and D50 stone size) with appropriate details. | | | |
| 17 | Drainage pipe sizes and inverts are shown on the plans (existing and proposed). This includes existing drainage infrastructure downstream of the site. | | | |
| 18 | Outlet Control Structure: Pipes that discharge directly into the NJDOT drainage system must have an associated outlet control structure, whether or not the discharge is from a stormwater management basin | | | |
| 19 | Inlet Details for Type B and C Inlets are incorporated into the plan. | | | |
| 20 | Rights-of-way (ROW) are clearly shown on the plans. | | | |
| 21 | The maintenance schedule and plan are written according to Chapter 8, the chapter pertaining to the applicable BMP of the NJ Stormwater BMP Manual, as well as N.J.A.C. 7:8-5.8. | | | |
| 22 | Basins or other stormwater management measures are placed on the developer's property or ROW with an agreement for the developer or owner to maintain with details in the maintenance plan. | | | |
| 23 | The approved maintenance schedule and plan will be recorded as a part of the property's deed. | | | |
| 24 | Evidence of all applicable permit submissions or prior approvals provided to the NJDOT. Criteria from all relevant permitting agencies including, but not limited to Pinelands Commission, NJDEP, etc., have been applied in the design including any associated permit conditions. | | | |
| 25 | Two sets of calculations (stormwater management, drainage, and flood analysis, as necessary) and two sets of signed and sealed plans are included with the submission. Copies of executable H&H models are provided. | | | |
| 26 | Upon successfully addressing all hydrologic and hydraulic comments, the applicant/designer will submit a final electronic signed and sealed copy of all plan sheets, the drainage report, and any other relevant supporting materials to the NJDOT Hydrology and Hydraulics Unit before the approval of any access, operation or drainage permit. | | | |

No portion of the project which may result in impacts to the NJDOT roadway or drainage system should be constructed prior to approval from NJDOT.

The applicant/designer acknowledges that any construction is at their own risk and that the construction of portions of the project prior to the issuance of any approval does not obligate the NJDOT to approve the constructed project.

Designer provides "yes", "no", or "not applicable" response for each checklist item.

"N/A or not applicable" response – indicates checklist item does not apply to the project.

"No" response – indicates the checklist item was not provided as required – an explanatory comment is required.

Should the applicant/designer encounter any site conditions or additional information which would render inaccurate any portion of the hydrologic and hydraulic analysis submitted, the applicant agrees to immediately contact the NJDOT office issuing the permit in order to determine whether design changes are warranted prior to continuing construction. (Examples of site conditions which may significantly impact the submitted information include, but are not limited to, SHWT at higher elevations than anticipated, encountering a restrictive layer, and permeability rates inconsistent with design permeability rates, etc.)

Engineer Signature

NJPE License Number

Date